enough red or blue shift of similar peaks between compounds or different peaks all together.

Some substances of abuse were tested using the portable spectrometer system **10**. For example, shown in FIGS. **8** and **9** are graphs of sample data for codeine (an opiate) and dextromethorphan (an alkaloid), respectively. Spectral data of medications and recreational drugs can be obtained over time to create a library database that can be used by officers and agents.

It should be understood that this approach is not limited to the identification of substances of abuse. It can also be used to identify the quality of petroleum products from new wells, the identity of biological stains (such as semen or urine), the identification of explosives, and any other application where a unique fluorescence signal can be measured.

CONCLUSION

The forensics community is in need of a more reliable and convenient test for on-site drug testing. Current methods such as Marquis' reagent and cobalt thiocyanate can yield many false positives and negatives and a portable GC-MS instrument requires proper training and is too expensive for every field officer or agent to have one. The portable spectrometer described herein is relatively inexpensive, easy to use, is compatible with smart phones, and yields more reliable results based on the luminescence spectra of d^{10} metal cluster compounds with the drug itself as the ligands. Prior research has shown that the presently disclosed method of testing, especially when using copper(I) iodide, will yield a luminescent cluster compound with amines that emits in the visible spectrum range. The emission spectral profiles for each drug with different d^{10} metal salts can be used to presumptively identify an unknown substance if it is an alkaloid, opiate, or some other amine compound.

The foregoing description provides illustration and description, but is not intended to be exhaustive or to limit the inventive concepts to the precise form disclosed. Modifications and variations are possible in light of the above teachings or may be acquired from practice of the methodologies set forth in the present disclosure.

Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure. In fact, many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. Although each dependent claim listed below may directly depend on only one other claim, the disclosure includes each dependent claim in combination with every other claim in the claim set.

No element, act, or instruction used in the present application should be construed as critical or essential to the invention unless explicitly described as such outside of the preferred embodiment. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed is:

1. A portable spectrometer system, comprising:

a test strip having a fluorescent indicator and adapted to receive a sample to be analyzed, wherein the test strip comprises a substrate at least partially coated with a d^{10} metal salt; and further wherein the substrate is at least coated with a polymer selected from the group consisting of polyvinylpyrrolidone, polyvinyl alcohol, and combinations thereof;

a fluorimeter comprising:

a housing having a plurality of interconnected walls at least partially surrounding a cavity, at least one of the walls having an opening;

a light source positioned in the cavity and adapted to emit light having a path;

a support for receiving the test strip having the sample to be analyzed, the support located within the path of the light such that the light contacts the sample to cause an emission from the fluorescent indicator; and

an optical spectrum separation assembly positioned to: receive the emission from the fluorescent indicator located at the support, separate the emission into an emission spectrum, and direct the separated emission spectrum through the opening;

a mobile computing device comprising:

an optical sensor positioned to receive the separated emission spectrum passing through the opening and to generate an image indicative of the separated emission spectrum; and

a processor having instructions to analyze the image to determine the presence of and, if present, the identity of any illicit substance within the sample.

2. The portable spectrometer of claim **1**, wherein the d^{10} metal salt is a compound comprising a metal with an electronic configuration of d^{10} and an anion selected from the group consisting of group 17 elements, cyanide (CN—), thiocyanate (SCN—), and combinations thereof.

3. The portable spectrometer system of claim **2**, wherein the d^{10} metal salt is selected from the group consisting of copper (I) iodide, copper (I) bromide, silver (I) iodide, silver (I) bromide, gold (I) bromide, gold (I) iodide, zinc iodide, zinc bromide, cadmium iodide, cadmium bromide, mercury (I) iodide, mercury (I) bromide, and combinations thereof.

4. The portable spectrometer system of claim **1**, wherein the illicit substance to be analyzed comprises an amine group.

5. The portable spectrometer system of claim **1**, wherein the at least one wall having the opening is a first wall, and wherein the fluorimeter further comprises a switch located on the first wall for sensing a presence of the mobile computing device on the first wall, the switch operably connected to the light source for enabling the light source to emit light responsive to the presence of the mobile computing device on the first wall.

6. The portable spectrometer system of claim **1**, wherein the optical spectrum separation assembly comprises an optical guide within the cavity in the path of the light and constructed of a material that is opaque to the light, the optical guide having a slit in the path of the light that passes a portion of the light.

7. The portable spectrometer system of claim **1**, wherein the processor has instructions to analyze the image to determine the identity of the illicit substance by comparing pixel values representative of emission spectra within the image to a library of emission spectra of known substances.

8. The portable spectrometer system of claim **1**, wherein the mobile computing device is selected from the group consisting of a laptop computer, a cellular telephone, a personal digital assistant, a tablet computer, and combinations thereof, wherein the mobile computing device has at least one optical sensor.

9. The portable spectrometer system of claim **1**, wherein the optical sensor is a camera.

10. The portable spectrometer system of claim **1**, wherein the light source is a light emitting diode.

11. A method of analyzing a sample using the portable spectrometer system of claim **1**, comprising the steps of: